

### **REMARKS**

The Official Action dated December 4, 2008 has been carefully considered. Additionally, Applicants acknowledge and appreciate the telephone interview of April 30, 2009 which the Examiner courteously afforded the undersigned. The present Amendment is believed sufficient to place the present application in condition for allowance. Reconsideration is respectfully requested.

During the interview, the Examiner and the undersigned discussed the amendments to claims 3 and 5 as set forth herein, the differences between the process of claim 5 and the teachings of the cited Miyahara et al and Sato et al references applied in the Official Action, and the poly(arylene sulfide) of claim 3 and the polymers of these cited prior art references. The Examiner indicated that the amendments to claim 5 set forth herein distinguish over the processes of the cited Miyahara et al and Sato et al references.

By the present amendment, claims 3 and 5 are amended to recite the bis(4-chlorophenyl) sulfide content as lower than 30 ppm, the ratio (MV2/MV1) of a melt viscosity value (MV2) of the poly(arylene sulfide) after a reaction with aminosilane to the melt viscosity value (MV1) before the reaction as 2.1 to 3.0, and a yellow index of at most 7, as set forth in previous claim 4, which has been cancelled, and the specification at page 22, line 24-page 23, line 3, page 23, lines 11-20, and page 24, lines 12-15. Claim 5 is also amended to recite the alkali metal hydrosulfide as an aqueous mixture with water and the alkali metal hydroxide as an aqueous mixture with water in the dehydration step, in accordance with previous claim 6, which has been cancelled, and the specification at page 9, line 27-page 10, line 3 and page 10, lines 18-20. Further, claim 5 is amended to clarify that the poly(arylene sulfide) as described is provided at the completion of polymerization, in accordance with the teachings throughout the specification and examples.

Finally, claim 11 is amended for clarity. It is believed that these changes are fully supported by the original specification, whereby entry of the present Amendment is in order and is respectfully requested.

In the Official Action, claims 3-7 and 10-13 were rejected under 35 U.S.C. 102(b) as being unpatentable over Miyahara et al, US 5,840,830. The Examiner asserted that Miyahara et al teach that sodium sulfide can be produced by in situ reaction of sodium hydrosulfide and sodium hydroxide (column 4, lines 61-64) and that these reactants can be used in equimolar amounts (column 6, lines 49-53). The Examiner further asserted that if such a step is employed, the resulting ratio of NaOH to S is (23.45/22.83) or 1.027 (page 5), whereby Miyahara et al anticipate the process of claim 5. Finally, the Examiner asserted the PAS of claim 3 is inherently produced by Miyahara et al.

This rejection is traversed and reconsideration is respectfully requested. Applicants submit that Miyahara et al do not teach the process of claim 5 or the poly(arylene sulfide) (PAS) defined by claim 3, or the improvements thereof. More particularly, the process for producing a PAS according to the present invention and as defined in claim 5 comprises four important process steps which, in combination, provide a PAS having a desirable combination of improved properties as set forth in both claims 3 and 5. Specifically, in the dehydration step (1), an organic amide solvent, and an alkali metal hydrosulfide and an alkali metal hydroxide, both as aqueous mixtures, are heated and reacted in a proportion of 0.95 to 1.05 mol of alkali metal hydroxide per mol of the alkali metal hydrosulfide, wherein distillate containing water is discharged to the exterior of the system and hydrogen sulfide formed upon the dehydration is discharged as a gas to the exterior of the system. In the subsequent charging step (2), the total number of mols of (i) alkali metal hydroxide formed with hydrogen sulfide formed upon the

dehydration, (ii) the alkali metal hydroxide added prior to the dehydration, and (iii) the alkali metal hydroxide added after the dehydration is 1.015 to 1.075 mols per mol of the charged sulfur source and the mols of water are controlled to provide 0.5 to 2.0 mols of water per mol of the charged sulfur source. Additionally, the polymerization is conducted in the defined first-stage polymerization step (3) and the defined second-stage polymerization step (4) to provide a polymer as claimed.

The combination of the defined steps (1)-(4) is important in providing a PAS polymer product in high yield and having good melt viscosity, low yellowness index, low dimer byproduct, good reactivity with aminosilane coupling agents, and low volatility from the alkali metal hydrosulfide and alkali metal hydroxide reactants. It is preferred to use these reactants as they are less expensive than the traditionally employed alkali metal sulfide. However, in the past, it has been difficult to produce a polymer having a good combination of properties in a stable manner using these reactants, as described in the present specification, beginning at page 2, line 17. As further described in the present specification, for example beginning at page 17, line 6, the alkali metal hydroxide reacts with the organic amide solvent in the dehydration heat treatment to form an alkali metal alkylaminoalkanoate, and the alkali metal hydrosulfide exists in the system in the form of a complex with the alkali metal alkylaminoalkanoate. On the other hand, a part of the alkali metal hydrosulfide reacts with water to form hydrogen sulfide and an alkali metal hydroxide, and the hydrogen sulfide formed is discharged outside the system. The steps recited in claim 5 control these various reactions arising from the use of the alkali metal hydrosulfide and alkali metal hydroxide reactants to provide a stable reaction and a polymer product having a consistently good combination of properties as recited.

Miyahara et al disclose a process for producing poly(arylene sulfide) wherein an alkali metal sulfide such as sodium sulfide is reacted with a dihaloaromatic compound, and wherein hydrogen sulfide vaporized off during the dehydration step is recovered and reused. Miyahara et al indicate that the sodium sulfide can be produced by in situ reaction of sodium hydrosulfide and sodium hydroxide (column 4, lines 61-64) and that these reactants can be used in equimolar amounts (column 6, lines 49-53). Importantly, Miyahara et al fail to exemplify any process wherein sodium sulfide is formed *in situ* as required by present claim 5, and particularly fail to disclose a dehydration step as recited in claim 5, wherein a mixture containing (i) organic amide solvent, (ii) an alkali metal hydrosulfide as an aqueous mixture with water, and (iii) an alkali metal hydroxide as an aqueous mixture with water, are heated to discharge at least a part of a distillate containing water from the interior of the system containing the mixture to the exterior of the system and to discharge hydrogen sulfide formed upon the dehydration as a gas to the exterior of the system. To the contrary, Miyahara et al only specifically describe the use of sodium sulfide as a reactant and require that the hydrogen sulfide formed in the dehydration is recovered and reused.

While the Examiner asserted in the Official Action that the present claims do not exclude the recovery and reuse of the discharged hydrogen sulfide, Applicants submit that the present claims, in reciting discharge of at least a part of a distillate containing water from the interior of the system containing the mixture to the exterior of the system and discharge of hydrogen sulfide formed upon the dehydration as a gas to the exterior of the system, preclude the recovery and reuse taught by Miyahara et al. That is, Miyahara et al disclose that hydrogen sulfide is discharged together with water or an azeotropic mixture of water and organic amide solvent and subsequently recovered (see, for example, column 7, lines 44-55).

Importantly, the formation of hydrogen sulfide occurs differently in the process of claim 5 employing alkali metal hydrosulfide as compared to the method exemplified by Miyahara et al employing sodium sulfide, whereby the amount of hydrogen sulfide lost in the dehydration differs and therefore the amount of sulfur remaining for reaction differs, and, in turn, the resulting PAS properties differ. That is, Applicants have discovered that a difference in the amount of hydrogen sulfide which is lost is related to the fact that in the dehydration step according to the present invention, as discussed above, the alkali metal hydroxide reacts with the organic amide solvent by the heat treatment to form an alkali metal alkylaminoalkanoate, and the alkali metal hydrosulfide exists in the system in the form of a complex with the alkali metal alkylaminoalkanoate (see, for example, paragraph [0046] in the present specification).

A prior art disclosure of a generic invention encompassing a vast number of embodiments does not by itself anticipate a more specifically claimed invention within the meaning of 35 U.S.C. §102; rather, such a prior art reference must further provide a more specific, limited teaching relating to the claimed invention in order to anticipate the same. *In re Petering*, 133 U.S.P.Q. 275 (C.C.P.A. 1962); *In re Ruschig*, 145 U.S.P.Q. 274 (C.C.P.A. 1965); *In re Arkley*, 172 U.S.P.Q. 524 (C.C.P.A. 1972). Accordingly, in view of the failure of Miyahara et al to exemplify a process combining use of the alkali metal hydrosulfide and the alkali metal hydroxide as the sulfur source, particularly in accordance with steps (1)-(4) as presently claimed, Miyahara et al do not anticipate the process of claim 5 under 35 U.S.C. §102 and do not provide any basis for asserting that the PAS of claim 3 is inherent in a process of Miyahara et al.

Further, while the Examiner asserted that applying an *in situ* formation of sodium sulfide in Example 1a disclosed by Miyahara et al results in the claimed invention, Applicants submit that applying an *in situ* sodium sulfide formation in the Miyahara et al process does not result in

a process as recited in claim 5 or a PAS as recited in claim 3, even if the ratio of NaOH to available S is 1.027 as asserted by the Examiner. In this regard, the Examiner's attention is directed to Comparative Example 4 disclosed in the present specification, wherein the ratio of NaOH in the reactor to available S is 1.041 (mol/mol) and therefore within the claimed range of "1.015 to 1.075" in present claim 5. However, in this Comparative Example 4, while the melt viscosity is 130 Pa·s, the bis(4-chlorophenyl) sulfide content is 85 ppm and the ratio (MV2/MV1) is 1.8, both of which are outside the ranges required by claims 3 and 5. Accordingly, Comparative Example 4 demonstrates that the PAS defined in the present claims does not necessarily result merely from the NaOH to available sulfur ratio, but, rather, from a combination of the production process conditions of claim 5. Miyahara et al provide no teaching, suggestion or recognition in this regard, and Comparative Example 4 demonstrates that the PAS of Miyahara et al cannot be assumed to exhibit the claimed PAS properties merely if *in situ* formation of sodium sulfide employs a NaOH to available S ratio of 1.027.

Further, to establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill; inherency may not be established by probabilities or possibilities and the mere fact that a certain thing may result from a given set of circumstances is not sufficient, *In re Robertson*, 49 U.S.P.Q. 2d 1949, 1950-51 (Fed. Cir. 1999). Similarly, the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic, *In re Rijckaert*, 28 U.S.P.Q. 2d 1955, 1957 (Fed. Cir. 1993). In the absence of Miyahara et al specifically teaching a process as presently claimed, there is no basis for the position that a PAS as recited in claim 3 is inherent in the teachings of, i.e., is necessarily present in, Miyahara et al. Miyahara et al do not provide the

requisite evidence of inherency, particularly since Miyahara et al do not exemplify a process as claimed. While, as noted by the Examiner, a reference is not limited to its examples, the teachings of a reference on which inherency rejection may be made are limited to the specific teachings of the reference. Thus, Miyahara et al do not anticipate the PAS of claim 3, or the PAS provided by claim 5.

Nor do Miyahara et al render such PAS obvious. It is an object of the present invention to provide a production process of a PAS which has extremely low bis(4-chlorophenyl) sulfide impurity, is excellent in reactivity to silane coupling agents such as  $\gamma$ -aminopropyltriethoxysilane (i.e., aminosilane), has low volatile matter, and is good in color tone, by use of an alkali metal hydrosulfide and an alkali metal hydroxide to stably conduct the polymerization reaction. Significantly, in the art of PAS, the present low bis(4-chlorophenyl) sulfide impurity content as required by claim 3 has not been previously achieved. Importantly, when the bis(4-chlorophenyl) sulfide content in a PAS is 30 ppm or more, the volatile matter content is undesirably excessive when the PAS is injection-molded. As a result, the molded product tends to have defects in its appearance and/or the amount of impurities adhering to the mold increases to markedly lower workability in molding and processing. Miyahara et al provide no apparent reason for one of ordinary skill in the art to achieve such a product and particularly how to achieve the presently claimed low content of bis(4-chlorophenyl) sulfide impurity.

Additionally, Miyahara et al neither teach nor suggest a PAS which is excellent in reactivity to silane coupling agents. On the other hand, according to the present invention as defined by claim 3, a PAS having a ratio (MV2/MV1) of a melt viscosity value (MV2) of the PAS after a reaction with aminosilane (i.e.,  $\gamma$ -aminopropyltriethoxysilane) to the melt viscosity value (MV1) before the reaction of 2.1 to 3.0, as measured at a temperature of 310°C and a shear

rate of  $1,216 \text{ sec}^{-1}$ . A higher ratio indicates a higher reactivity of the PAS to a silane coupling agent, reducing the tendency for burrs to occur in melt molding and widening the latitude of acceptable melt processing conditions. On the other hand, if the MV2/MV1 is lower than 2, such a polymer tends to exhibit more burrs in melt molding and/or a narrower latitude of processing conditions. Additionally, when the production process of PAS according to the present invention is used, the MV2/MV1 ratio is also stabilized. On the other hand, when the MV2/MV1 ratio varies, the melt viscosity of a composition comprising such a PAS and aminosilane tends to vary and such polymers are not preferred. Accordingly, it is desirable to control the ratio within a fixed range, as provided by the present invention. Miyahara et al not only fail to teach the presently claimed process but also fail to provide one of ordinary skill in the art with any apparent reason for modifying the teachings of Miyahara et al to provide a PAS as defined in claim 3. Accordingly, the PAS of claim 3 and the PAS produced by the process of claim 5 are nonobvious over and patentably distinguishable from Miyahara et al.

It is therefore submitted that the rejection under 35 U.S.C. § 102 based on Miyahara et al has been overcome. Reconsideration is respectfully requested.

Claims 3-7 and 10-13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sato et al, JP 2000-191785. The Examiner asserted that Sato et al teach that sodium sulfide can be produced by in situ reaction of sodium hydrosulfide and sodium hydroxide in paragraph [0018] and that these reactants can be used in equimolar amounts in paragraph [0026]. The Examiner further asserted that if such a step is employed in application example 1 of Sato et al, the resulting ratio of NaOH to S is (23.873/22.04) or 1.083, which is very close to the ratio of claim 5 and one skilled in the art would have expected the product to have the claimed



properties. Finally, the Examiner asserted the poly(arylene sulfide) of claim 3 is inherently produced by Sato et al.

This rejection is traversed and reconsideration is respectfully requested. The process and PAS of the invention are discussed above. Importantly, Sato et al do not teach a process as recited in claim 5, and therefore Sato et al do not provide any basis for assuming that the PAS properties recited in claims 3 and 5 are inherent in the product of Sato et al. More specifically, Sato et al disclose a process for producing poly(arylene sulfide) wherein water is added into the reaction system after the reaction start to form a liquid-liquid phase separated state of a polymer-rich phase and a polymer-dilute phase. In the production process exemplified by Sato et al, alkali metal sulfide is used as a sulfur source. Although Sato et al further state that the alkali metal sulfide can be prepared from hydrogen sulfide or an alkali metal hydrosulfide and an alkali metal hydroxide *in situ* in almost equimolar amounts in an organic amide solvent (paragraphs [0018] and [0026]), Sato et al do not exemplify any process combining use of the alkali metal hydrosulfide and the alkali metal hydroxide as the sulfur source, particularly in accordance with steps (1)-(4) as set forth in claim 5.

Particularly, in the process of claim 5, the dehydration step comprises heating and reacting a mixture containing (i) the organic amide solvent, (ii) an alkali metal hydrosulfide as an aqueous mixture with water, and (iii) an alkali metal hydroxide as an aqueous mixture with water, the alkali metal hydroxide being employed in a proportion of 0.95 to 1.05 mol per mol of the alkali metal hydrosulfide, and discharging at least a part of a distillate containing water from the interior of the system containing the mixture to the exterior of the system, and discharging hydrogen sulfide formed upon the dehydration as a gas to the exterior of the system. As discussed above, in the present process, the alkali metal hydroxide reacts with the organic amide

solvent in the dehydration heat treatment to form an alkali metal alkylaminoalkanoate, and the alkali metal hydrosulfide exists in the system in the form of a complex with the alkali metal alkylaminoalkanoate. On the other hand, a part of the alkali metal hydrosulfide reacts with water to form hydrogen sulfide and an alkali metal hydroxide, and the hydrogen sulfide formed is discharged outside the system. The steps recited in claim 5 control these various reactions arising from the use of the alkali metal hydrosulfide and alkali metal hydroxide reactants to provide a stable reaction and a polymer product having a consistently good combination of properties as recited.

Not only do Sato et al fail to specifically teach and exemplify such a process, Sato et al admit that their PAS does not meet the limitations of claims 3 and 5. That is, the PAS of claims 3 and 5 has a melt viscosity (MV1) of 30 to 500 Pa·s as measured at a temperature of 310°C and a shear rate of 1,216 sec<sup>-1</sup>. On the other hand, while Sato et al employ conditions for measuring melt viscosity comparable to those presently claimed (a temperature of 310°C and a shear rate of 1,200 sec<sup>-1</sup> according to Sato et al versus a temperature of 310°C and a shear rate of 1,216 sec<sup>-1</sup> according to claims 3 and 5), Sato et al disclose their polymerization process results in a polymer having a lower melt viscosity:

“The resultant PAS is a high-molecular weight or relatively high-molecular weight polymer, and the melt viscosity (as measured at a temperature of 310°C and a shear rate of 1,200 sec<sup>-1</sup>) thereof is generally 3 Pa·s or higher, preferably 5 Pa·s or higher, more preferably 10 Pa·s or higher.” (JP 2000-191785A, paragraph [0050]).

The melt viscosity of the exemplified polymers in Examples 1-3 of Sato et al are 16 Pa·s (paragraph [0058]), 23 Pa·s (paragraph [0063]), and 15 Pa·s [paragraph 0069]). Sato et al teach that to obtain a higher melt viscosity, for example, as presently claimed, a further heat treatment,

subsequent to polymerization, must be performed (see paragraph [0051]) or that a dehydration step after the second-stage polymerization step is omitted and the high temperature reaction conditions are maintained for an extended period of time (12 hours) after polymerization is completed, also resulting in increased sodium content (see paragraph [0070]). Sato et al's Example 4 demonstrates this latter method wherein the production process was conducted in exactly the same manner as in Example 1 except that the temperature of the reactor was kept for 12 hours at 260°C without conducting dehydration after completion of the second-stage polymerization in Example 1 (paragraph [0070]). Sato et al also exemplify the subsequent heat treatment of the polymer products of Examples 1-3 to obtain higher melt viscosities. However, Sato et al fail to provide a two-step polymerization method as presently claimed wherein at the completion of polymerization a PAS with a melt viscosity of 30 to 500 Pa·s as measured at a temperature of 310°C and a shear rate of 1,216 sec<sup>-1</sup> is provided as required by claims 3 and 5. Rather, Sato et al require other processes for obtaining the presently claimed melt viscosities.

Further, as noted by the Examiner, Sato et al fail to employ a mol ratio of alkali metal hydroxide to sulfur source within the presently claimed range of 1.015 to 1.075, as the Examiner asserted that Sato shows the use of a mol ratio of 1.083. While the Examiner concluded that the present process does not see substantial differences in the PAS until a mol ratio of 1.10 is employed, Applicants respectfully disagree. That is, claims 3 and 5 require a bis(4-chlorophenyl) sulfide impurity (dimer impurity) content of lower than 30 ppm. Examples 1-3 in the present specification show that a mol ratio of 1.020 results in a PAS having 21 ppm dimer impurity (Example 2), a mol ratio of 1.050 results in a PAS having 13 ppm dimer impurity (Example 1), and a mol ratio of 1.075 results in a PAS having 25 ppm dimer impurity (Example 3). On the other hand, Comparative Example 3 shows that when the mol ratio of

NaOH/available S is 1.10, thereby exceeding the upper limit value of 1.075 as defined by claim 5, the amount of dimer impurity is 66 ppm, significantly above the 30 ppm limit. One skilled in the art will appreciate that this data shows that as the mol ratio is increased, even a small amount above 1.075, the generation of dimer impurity is also increased. Thus, the failure of Sato et al to disclose the claimed ratio and Applicants' showing of the mol ratio effect on the resulting PAS impurity content prevents Sato et al from rendering the PAS of claim 3 and the process of claim 5 obvious.

In view of the differences in the process of claim 5 and that of Sato et al, including the differences discussed above, the evidence of record does not provide a basis for finding that Sato et al's PAS inherently exhibits the combination of properties recited in claims 3 and 5. To the contrary, Sato et al teach that their process results in a PAS having a lower melt viscosity and the evidence in the specification examples show a higher NaOH to available S mol ratio results in higher dimer impurity. Thus, there is no reason of record to find that other properties of the Sato et al PAS will not similarly deviate from those recited in claims 3 and 5.

In fact, the Examiner admits that Sato et al do not explicitly teach a PAS having a bis(4-chlorophenyl) sulfide content lower than 50 ppm as determined by a gas chromatographic analysis, and a ratio (MV2/MV1) of a melt viscosity value (MV2) of the PAS after a reaction with aminosilane to the melt viscosity value (MV1) before the reaction exceeding 2.0 as measured at a temperature of 310 °C and a shear rate of 1216 sec<sup>-1</sup>. In addition, Sato et al do not disclose the claimed yellow index. Nor do Sato et al render the properties obvious.

As discussed above, it is an object of the present invention to provide a production process for a PAS which has an extremely low content of bis(4-chlorophenyl) sulfide, is excellent in reactivity to silane coupling agents such as  $\gamma$ -aminopropyltriethoxysilane (i.e.,

aminosilane), has little or no volatile matter and has good color tone, by using an alkali metal hydrosulfide and an alkali metal hydroxide as a sulfur source to stably conduct a polymerization reaction. When the bis(4-chlorophenyl) sulfide content is above 30 ppm, the volatile matter content becomes excessive when the PAS is injection-molded, so that the resulting molded product tends to exhibit defects in its appearance and/or impurities attach to the mold to lower workability upon molding and processing. However, in the art of PAS, the importance of an extremely low content of bis(4-chlorophenyl) sulfide has not been known, and Sato et al neither teach nor suggest that the content of bis(4-chlorophenyl) sulfide should be extremely low. Accordingly, Sato et al provide no apparent reason to one of ordinary skill in the art to modify their teachings to arrive at this property.

Additionally, Sato et al neither teach nor suggest their PAS is excellent in reactivity to silane coupling agents. According to the production process of the present invention, the PAS has a ratio (MV2/MV1) of a melt viscosity value (MV2) of the PAS after a reaction with aminosilane to the melt viscosity value (MV1) before the reaction of 2.1 to 3.0, as measured at a temperature of 310°C and a shear rate of 1216 sec<sup>-1</sup>. A higher ratio as presently claimed indicates a higher reactivity of the PAS to a silane coupling agent. When the reactivity to aminosilane is high, the viscosity of a molten composition of the PAS and aminosilane increases and the relation of the viscosity to the shear rate is improved so that the occurrence of burrs in melt molding is reduced and the selection latitude for melt processing conditions is widened. On the other hand, if the MV2/MV1 ratio is lower than 2, these improvements are noticeably lessened. When the production process of PAS according to the present invention is used, the MV2/MV1 ratio is also stabilized, thereby avoiding undesirable variations in a composition comprising such a PAS and aminosilane. Again, no teaching, suggestion or recognition of these

properties is found in Sato et al, whereby one of ordinary skill in the art has no apparent reason to modify the teachings of Sato et al to arrive at this property.

Further, the PAS obtained by the production process according to the present invention is good in color tone as its yellow index (YI) is generally at most 7. Such a PAS contains little volatile matter and therefore is particularly suitable for use in the field of electronic equipment and the like, in which inhibition of volatile matter is desired.

In order to render a claimed invention obvious under 35 U.S.C. §103, the prior art must enable one skilled in the art to make and use the claimed invention, *Motorola, Inc. v. InterDigital Tech Corp.*, 43 U.S.P.Q. 2d 1481, 1489 (Fed. Cir. 1997). Not only do Sato et al fail to disclose a production process as claimed to provide a basis for asserting that the Sato et al PAS inherently exhibits the properties of claims 3 and 5, Sato et al fail to teach, suggest or recognize the relevance of the properties of claims 3 and 5 in providing an improved PAS. Thus, Sato et al do not enable one of ordinary skill in the art to practice the production process of claim 5 or to make the PAS of claim 3. Accordingly, in view of the failure of Sato et al to exemplify a process combining use of the alkali metal hydrosulfide and the alkali metal hydroxide as the sulfur source, particularly in accordance with steps (1)-(4) as claimed, Sato et al do not render obvious the process of claim 5 under 35 U.S.C. §103 and do not provide any basis for asserting that the PAS of claim 3 is inherent in the process of Sato et al. Sato et al do not therefore render claims 3 and 5, or any of claims 7 and 10-13 dependent thereon, obvious under 35 U.S.C. § 103. It is therefore submitted that the rejection under 35 U.S.C. § 103 based on Sato et al has been overcome. Reconsideration is respectfully requested.

It is believed that the above represents a complete response to the Official Action and places the present application in condition for allowance. Reconsideration and an early allowance are requested.

Please charge any fees required in connection with the present communication, or credit any overpayment, to Deposit Account No. 503915.

Respectfully submitted,

/Holly D. Kozlowski/

Holly D. Kozlowski, Reg. No. 30,468  
Porter, Wright, Morris & Arthur LLP  
250 East Fifth Street, Suite 2200  
Cincinnati, Ohio 45202  
(513) 369-4224